

# Inter-Strip Capacitance Study of Readout Foil

## EIC GEM Project at FIT

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# Outline

- 1 Motivation
- 2 Procedure
- 3 Results
- 4 Conclusions



Figure: Photo credit: Sarah Arends

# Motivation

- High output capacitance → Noise
- Geometry of readout strips → Large inter-strip capacitance
- Measuring inter-strip capacitance → Determining produced noise

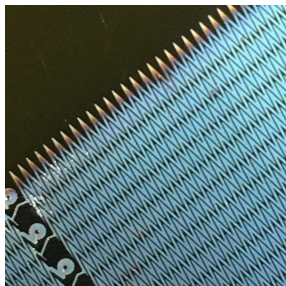


Figure: Photo credit: Sarah Arends

# Map of Measurements

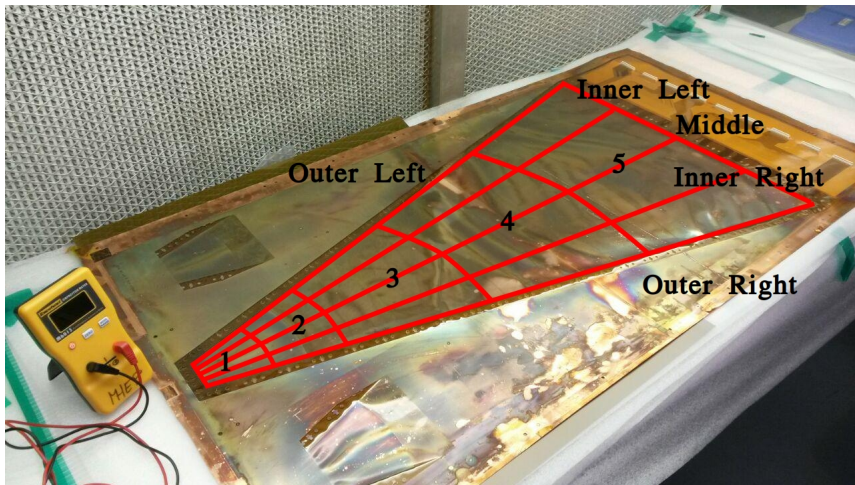


Figure:  $\eta$ -sectors 1-5,  $\varphi$ -positions

# Inter-Strip Capacitance Measurement

- Place capacitance meter probes above opposite ends of adjacent strips
- Zero the meter
- Place probes onto opposite ends of adjacent strips
- Wait for reading to steady and tabulate the value
- If reading not steady, repeat last 3 steps
- If reading steady, repeat measurement 2 more times
- Repeat measurement for each  $\eta$ -sector and  $\varphi$ -position

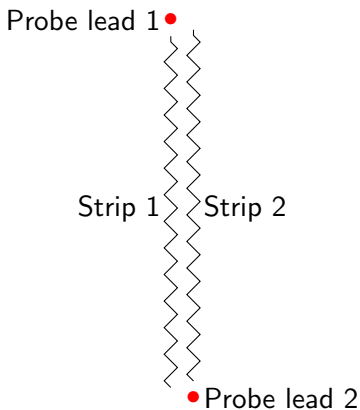


Figure: Diagram of inter-strip capacitance measurement

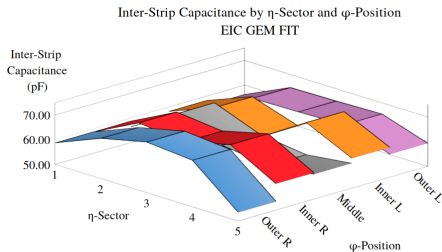
# Method of Analysis

- Measured inter-strip capacitance
- Calculated standard deviation for each point
- Points with std. dev. greater than  $1\text{ pF}$  were re-measured
- Inter-strip capacitance across the entire foil was analyzed

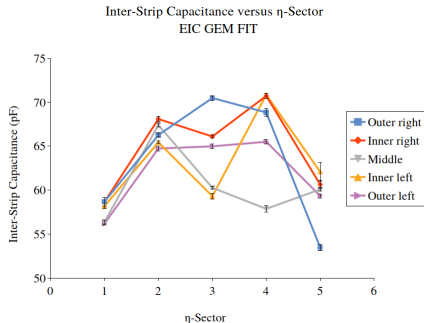


Figure: Photo credit: Sarah Arends

# Inter-Strip Capacitance Across Readout Foil



- Average inter-strip capacitance:  $62.82 \text{ pF}$
- Standard deviation:  $5.05 \text{ pF}$



- $\eta$ -sector 1: straight strips
- $\eta$ -sectors 2-5: zigzag strips

# Conclusions

- Inter-strip capacitance across the foil is large as expected
- Shorter strips in central regions → Dip in inter-strip capacitance